Spot Safety Project Evaluation

Project Log # 200512143

Spot Safety Project # 12-93-047

Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of SR 2439 (Lowell-Bethesda Rd) and
SR 2478 (Titman Rd)/SR 3030 (Regal Oaks Ct)
Gaston County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 12/7/06
Brad Robinson, EI Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 12-93-047 – The Intersection of SR 2439 (Lowell-Bethesda Rd) and SR 2478 (Titman Rd)/ SR 3030 (Regal Oaks Ct) in Gaston County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a two-phase, actuated traffic signal at the intersection of SR 2439 (Lowell-Bethesda Rd) and SR 2478 (Titman Rd)/SR 3030 (Regal Oaks Ct). SR 2439 and SR 2478/SR 3030 are both two-lane facilities with no turn lanes at the subject location.

SR 3030 (Regal Oaks Ct) is a neighborhood road with a speed limit of 25 mph, all other approaches have a speed limit of 45 mph. The subject location is a four-leg intersection, which was controlled by stop signs on SR 2478/3030. There are currently signal-ahead warning signs on all approaches to the intersection with the exception of SR 3030. It appears that a right-turn slip ramp from SR 2478 onto southbound SR 2439 was removed around the same time the traffic signal was installed.

There was no background information in the project file folder.

The final completion date for the improvement at the subject intersection was on September 29, 1997 with a total cost of $30,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from August 1, 1997 to October 31, 1997. The before period consisted of reported crashes from January 1, 1990 through July 31, 1997 (7 years and 7 months) and the after period consisted of reported crashes from November 1, 1997 through May 31, 2005 (7 years and 7 months). The beginning date for this analysis was determined by available crash data.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Total crashes	24	16	-33.3
Total Severity Index	4.39	8.51	93.8
Target Crashes	13	4	-69.2
Target Crash Severity Index	6.12	21.8	256.2
Volume	9,600	10,600	10.4
Injury Summary			
Fatal injuries	0	0	N/A
Class A injuries	0	1	N/A
Class B injuries	5	1	-80.0
Class C Injuries	18	11	-38.9
Total Injuries	23	13	-43.5

The naive before and after analysis at the treatment location resulted in a 33 percent decrease in Total Crashes, a 69 percent decrease in Target Crashes, and a 94 percent increase in the Total Severity Index. The before period ADT year was 1993 and the after period ADT year was 2001.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 33 percent decrease in Total Crashes, a 69 percent decrease in Target Crashes, a 94 percent increase in the Total Severity Index, and a 10 percent increase in ADT. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

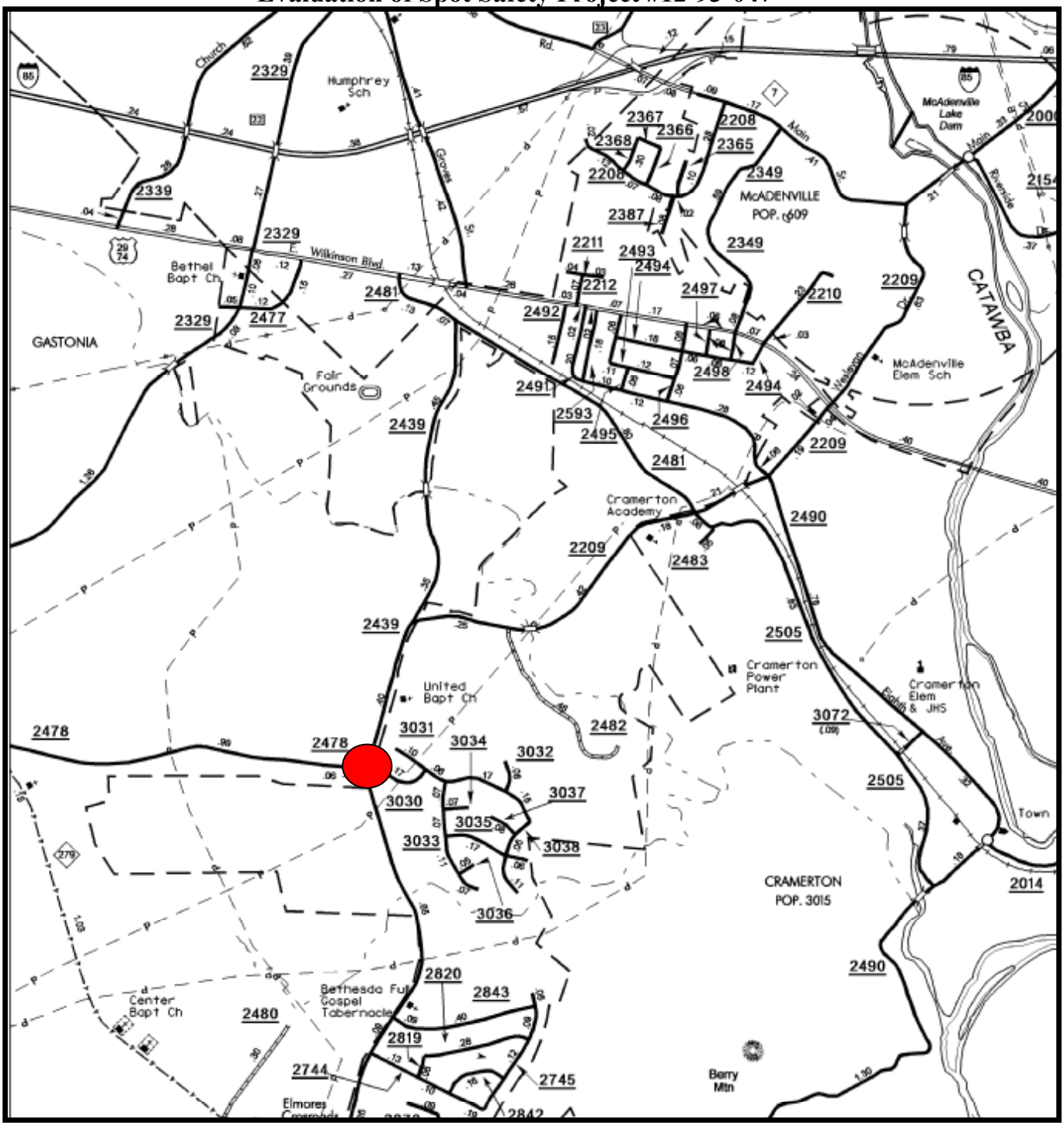
Referencing the *Collision Diagram* and the above table it is apparent that the installation of a traffic signal at the subject location was effective in reducing Target Crashes at the intersection. There was a Target Crash pattern between eastbound SR 2478 vehicles and southbound SR 2439 vehicles that was reduced by 88 percent (from 8 to 1).

The high Total Severity Index and Target Crash Severity Index in the after period can be attributed to a single "A" injury Left Turn-Same Roadway Crash (After Period Crash #3). A northbound driver on SR 2439 turning left onto SR 2478 stated that she did not see the southbound vehicle and turned in front of it. After conducting a field investigation it was observed that there is a slight curve approaching the intersection from the south, although there are no site distance deficiencies at the intersection.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Location Map
Gaston County
Evaluation of Spot Safety Project #12-93-047



Treatment Location: SR 2439 (Lowell-Bethesda Rd) at SR 2478 (Titman Rd)/SR 3030 (Regal Oaks)

Treatment Site Photos Taken September 20, 2006

Traveling South on SR 2439 (Lowell-Bethesda Rd)

Traveling South on SR 2439 (Lowell-Bethesda Rd)

Traveling North on SR 2439 (Lowell-Bethesda Rd)

Traveling North on SR 2439 (Lowell-Bethesda Rd)

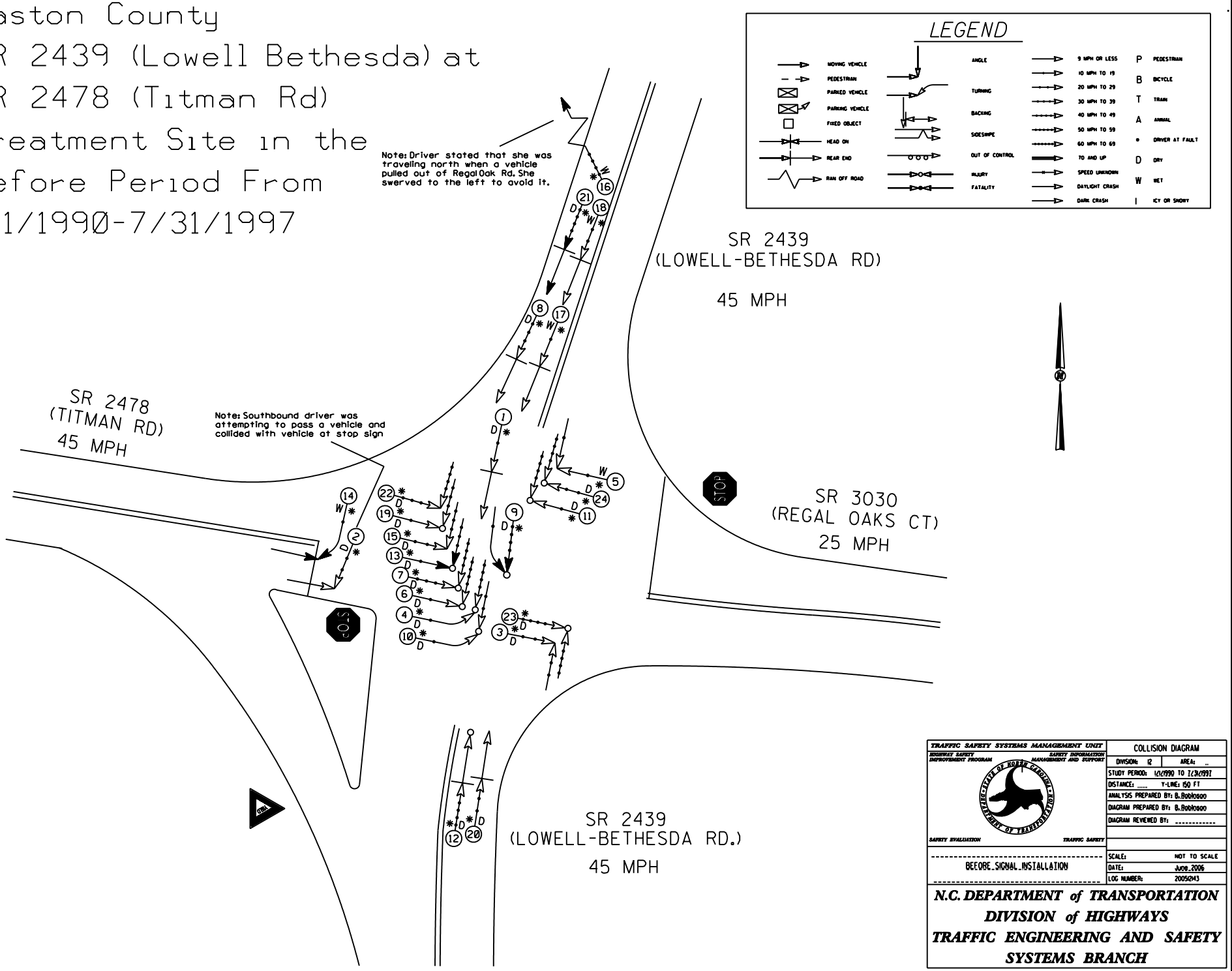
Traveling East on SR 2478 (Titman Rd)

Traveling East on SR 2478 (Titman Rd)

Traveling West on SR 3030 (Regal Oaks)

Traveling West on SR 3030 (Regal Oaks)

Gaston County
SR 2439 (Lowell Bethesda) at SR 2478 (Titman Rd)
Treatment Site in the Before Period From 1/1/1990-7/31/1997



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY

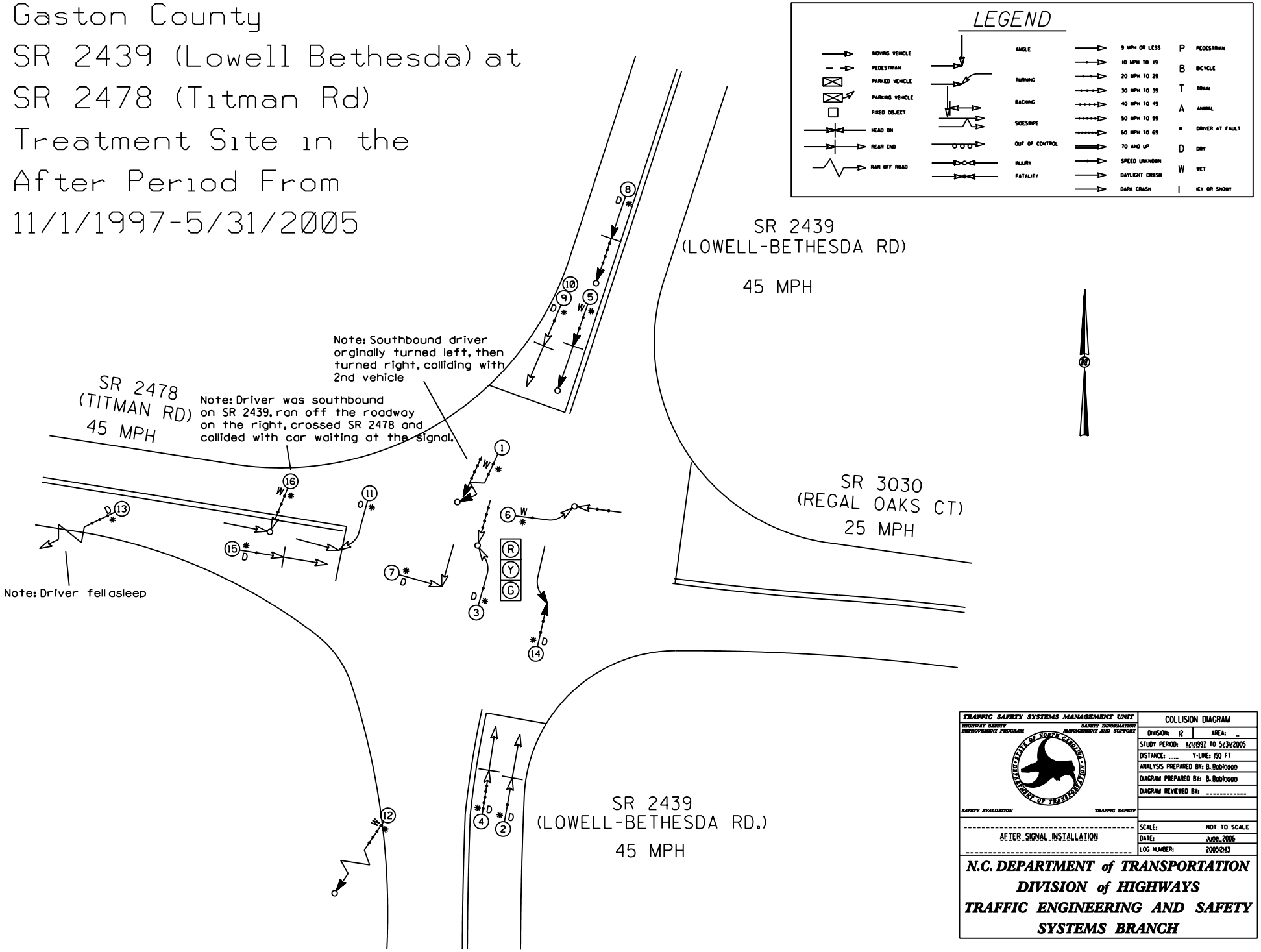
BEFORE SIGNAL INSTALLATION

COLLISION DIAGRAM

DIVISION: 12	AREA: ..
STUDY PERIOD: 1/1/1990 TO 7/31/1997	
DISTANCE:	Y-LINE: 150 FT
ANALYSIS PREPARED BY: B.Robinson	
DIAGRAM PREPARED BY: B.Robinson	
DIAGRAM REVIEWED BY: ----------	
SCALE:	NOT TO SCALE
DATE:	JUNE 2006
LOG NUMBER:	20052143

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

Gaston County
SR 2439 (Lowell Bethesda) at SR 2478 (Titman Rd)
Treatment Site in the After Period From 11/1/1997-5/31/2005



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT	COLLISION DIAGRAM
HIGHWAY SAFETY IMPROVEMENT PROGRAM / SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: 12 AREA: ..
	STUDY PERIOD: 11/1/1997 TO 5/31/2005
	DISTANCE: ..... Y-LINE: 150 FT
	ANALYSIS PREPARED BY: B.Robinson
	DIAGRAM PREPARED BY: B.Robinson
	DIAGRAM REVIEWED BY: ----------
SAFETY EVALUATION / TRAFFIC SAFETY	
AFTER SIGNAL INSTALLATION	SCALE: NOT TO SCALE
	DATE: JUNE 2006
	LOG NUMBER: 20050143

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DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH